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Two New Species of the Family Zetomotrichidae (Acari: Oribatida) from Japan

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Two new species of oribatid mites of the family Zetomotrichidae, *Ghilarovus saxicola* sp. nov. and *Mabulatrichus litoralis* sp. nov., are described from cliffside habitats of Japan. The authorship of the name *Zetomotrichus bidentata* Hammer, 1977 is discussed.

Key Words: Oribatida, Zetomotrichidae, *Zetomotrichus*, *Ghilarovus*, *Mabulatrichus*, new species, Japan.

Introduction

The most recent revision of the family Zetomotrichidae was made by Coetzee (1993), who redescribed *Zetomotrichus lacrimans* Grandjean, 1934, raised *Z. lacrimans* Grandjean var. *bidentata* Hammer, 1977 to species status, described three new genera and new species, and gave a key to the genera of Zetomotrichidae. At this moment, 11 genera and 20 species are assigned to the family.

In addition to these, we have found two new species from Japan, one belonging to the genus *Ghilarovus* and the second to the genus *Mabulatrichus*, which are described below. Both species were collected from cliffs, a habitat previously overlooked by us.

Ghilarovus saxicola sp. nov. (Figs 1–12)

Measurements. Body length, 320–372 µm; width, 203–248 µm.

Description. *Prodorsum.* Rostral margin medially and laterally dentate with about 23 small teeth of similar size and spacing, though only 12–13 teeth are visible in dorsal aspect (Figs 1, 3, and 8); rostral teeth only visible when rostrum flattened. Rostral seta *ro* moderately, lamellar seta *le* and interlamellar seta *in* weakly barbed; seta *in* 1.2–1.4× and seta *le* 1.4–1.8× as long as seta *ro*; seta *le* somewhat shorter than 2×(*le*–*le*), but extending well beyond rostrum to tip of rostral seta; exobothridial seta *ex* short and fine (Fig. 1). A distinct, irregular ridge present on posterior part of prodorsum on each side (Fig. 8), arising from bothridium and reaching beyond insertion of interlamellar seta. Bothridium small; posterior half

covered by notogaster; sensillus *ss* slender, approximately as long as seta *ro*, pectinate bilaterally, with 9–10 pectinations on one side and with 2–3 minute ones on the other (Fig. 4). Prodorsal surface smooth, with a few pores.

Notogaster. Dorsosejugal scissure absent. Humeral projection accompanied posteriorly by a round projection; humeral seta *c*, thickened and weakly barbed (Fig. 5). Remaining 9 pairs of notogastral setae fine and smooth (Fig. 1). Lyrifissure *ia* absent; *im* and *ip* long and distinct (Fig. 1); *ih* and *ips* short and indistinct. Integument of notogaster showing fine wrinkles from humeral projection to vicinity of seta *la*. A large humeral sac present on each side (Fig. 2). Numerous irregular fine foveae on notogaster; pores scattered irregularly on notogastral surface; notogaster overlapping ventral plate.

Ventral side (Fig. 2). All gnathosomal setae barbed; seta *a* shortest; seta *h* longest, about 3× as long as seta *a*. Acetabulum IV situated adjacent to acetabulum III. Apodemata II and *sj* weakly developed; custodium sharply pointed. Epimeral setal formula 3–1–3–3; seta *1a* longer than seta *2a*; setae *1a*, *1b*, *1c*, and *3c* long, weakly barbed; setae *3b* and *4c* shorter, smooth; setae *2a*, *3a*, *4a*, and *4b* short, fine, smooth. Genital plates with 4 pairs of setae; interspace *g₂*–*g₃* distinctly wider than *g₁*–*g₂* or *g₃*–*g₄* (Fig. 6). Anal plate with 2 pairs of setae; only 2 pairs of adanal setae present (Fig. 7). Adanal fissure *iad* long and aligned obliquely. Aggenital setae *ag* short and fine.

Legs (Figs 9–12). Chaetotaxy of legs I, 1–5–2–4–20; II, 1–5–2–4–16; III, 2–3–1–3–15; IV, 1–2–2–3–12. Solenidiotaxy I, 1–2–2; II, 1–1–2; III, 1–1–0; IV, 0–1–0. No specialized strong setae on legs. Tibia I triangular; tibia II dilated anteriorly, but not so strongly as tibia I. Ventral carina of femora I–IV poorly developed, on femur II indicated only as an irregular margin on anteroventral corner. Tibia IV with 4 setae. Trochanter IV somewhat longer than trochanter III; trochanter IV with one seta. All legs heterotridactylous; medial claw shorter and thicker than lateral claws.

Type series. Holotype (NSMT-Ac 11075, in spirit) and 5 paratypes (NSMT-Ac 11076–11080, 1 in spirit and 4 on slides): Kuronagi, Kurobe-shi, Toyama Prefecture, central Honshu, Japan, 25-VII-1998, Y. Hirauchi, from litter in *Tsuga sieboldii* forest on a cliff of the Kurobe River valley. The type series is deposited in the collection of the National Science Museum, Tokyo (NSMT).

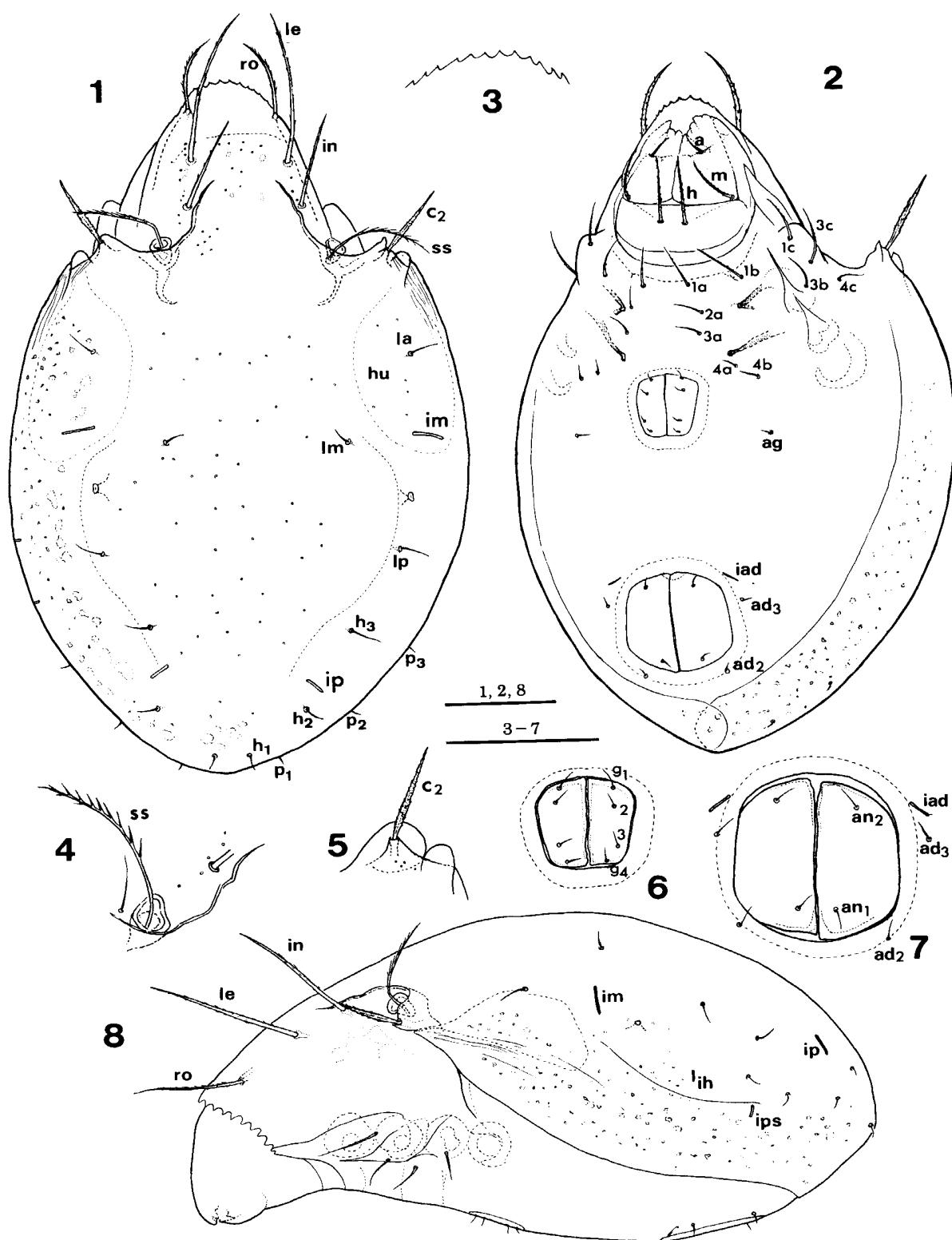
Remarks. *Ghilarovus saxicola* sp. nov. is easily distinguishable from the five known species of the genus by having only 2 pairs of adanal setae. Moreover, *Ghilarovus humeridens* Krivolutsky, 1966 and *G. turcmenicus* Krivolutsky, 1974 are distinguishable from the new species by (1) the rostral margin with teeth of different sizes, and (2) the absence of lamella-like ridges on prodorsum. *Ghilarovus hispanicus* Subias et Pérez-Iñigo, 1977 and *G. changulicensis* Wen, 1990 are distinguishable from the new species by (1) the sensillus being densely ciliated, (2) the absence of lamella-like ridges, and *G. elegans* Mahunka, 1983 differs from it in (1) the slender humeral setae, and (2) the lamellar setae reaching only a little beyond the rostral tip.

***Mabulatrichus litoralis* sp. nov.**
(Figs 13–23)

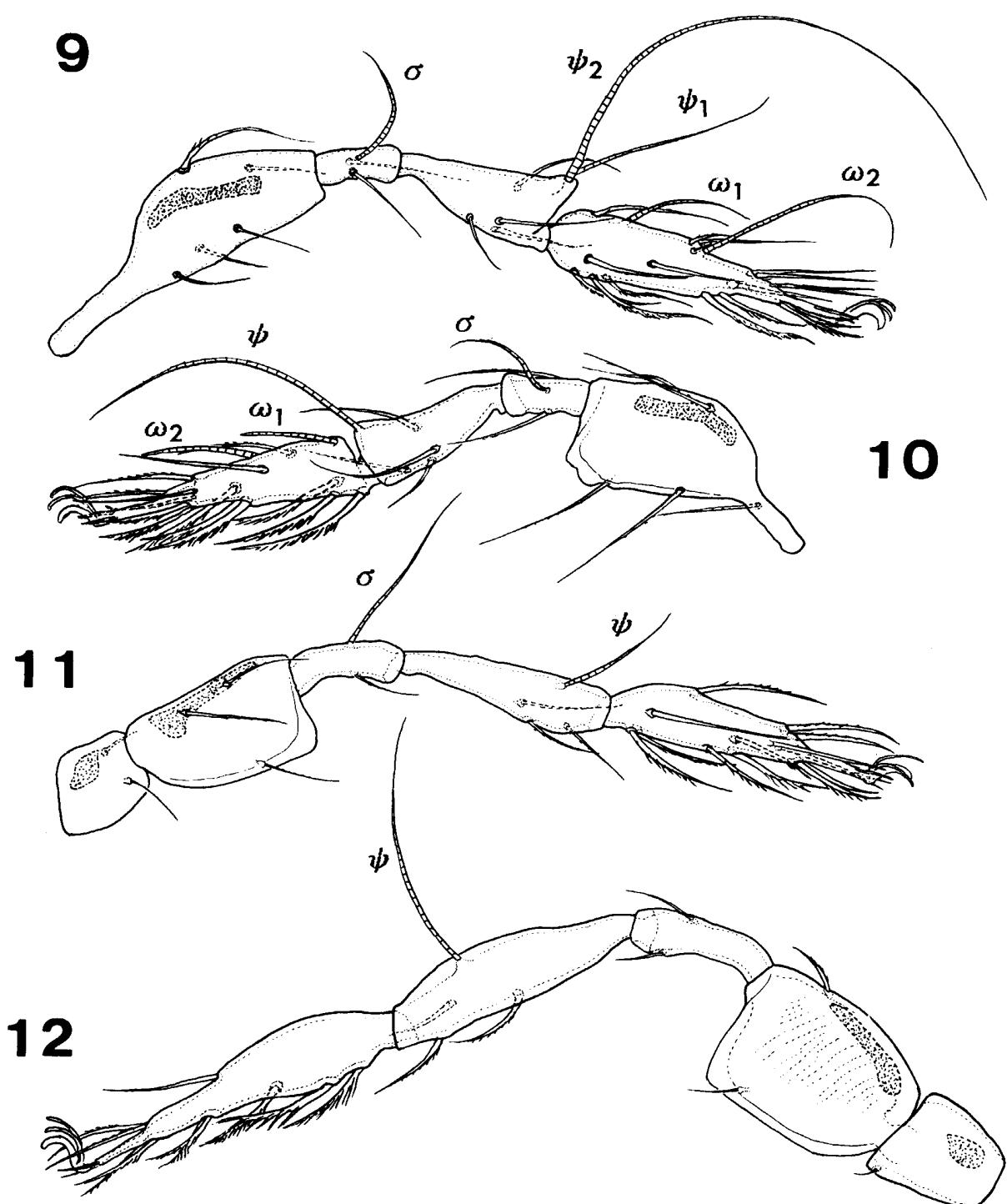
Measurements. Body length, 394–430 µm; width, 230–251 µm.

New species of Zetomotrichidae from Japan

353



Figs 1-8. *Ghilarovus saxicola* sp. nov. 1, dorsal side of body; 2, ventral side of body; 3, rostral margin; 4, bothridium and sensillus (ss); 5, humeral projection and humeral seta (c_2); 6, genital aperture; 7, anal aperture; 8, left lateral side of body. Scales: 0.05 mm.



Figs 9–12. *Ghilarovus saxicola* sp. nov. 9, leg I (antiaxial); 10, leg II (antiaxial); 11, leg III (antiaxial); 12, leg IV (antiaxial). Scale: 0.05 mm.

Description. *Prodorsum.* Rostral margin dentate with small teeth of similar size and spacing, appearing to number 11–13 in dorsal view of specimen (Figs 13, 18), but about 25 teeth evident when rostrum is flattened. Seta *ro* strongly and setae *le* and *in* weakly barbed; seta *in* 1.2× and seta *le* 1.5× as long as seta *ro*; seta *le* shorter than 2×(*le*–*le*), but extending well beyond rostrum to tip of rostral seta (Fig. 18). Distinct, irregular ridge arising from bothridium on posterior part of each side of prodorsum, reaching beyond insertion of interlamellar seta (Fig. 19). Sensillus slender, not densely pectinate, with only 6–7 pectinations on one side and with 2 minute ones on the other side (Fig. 15).

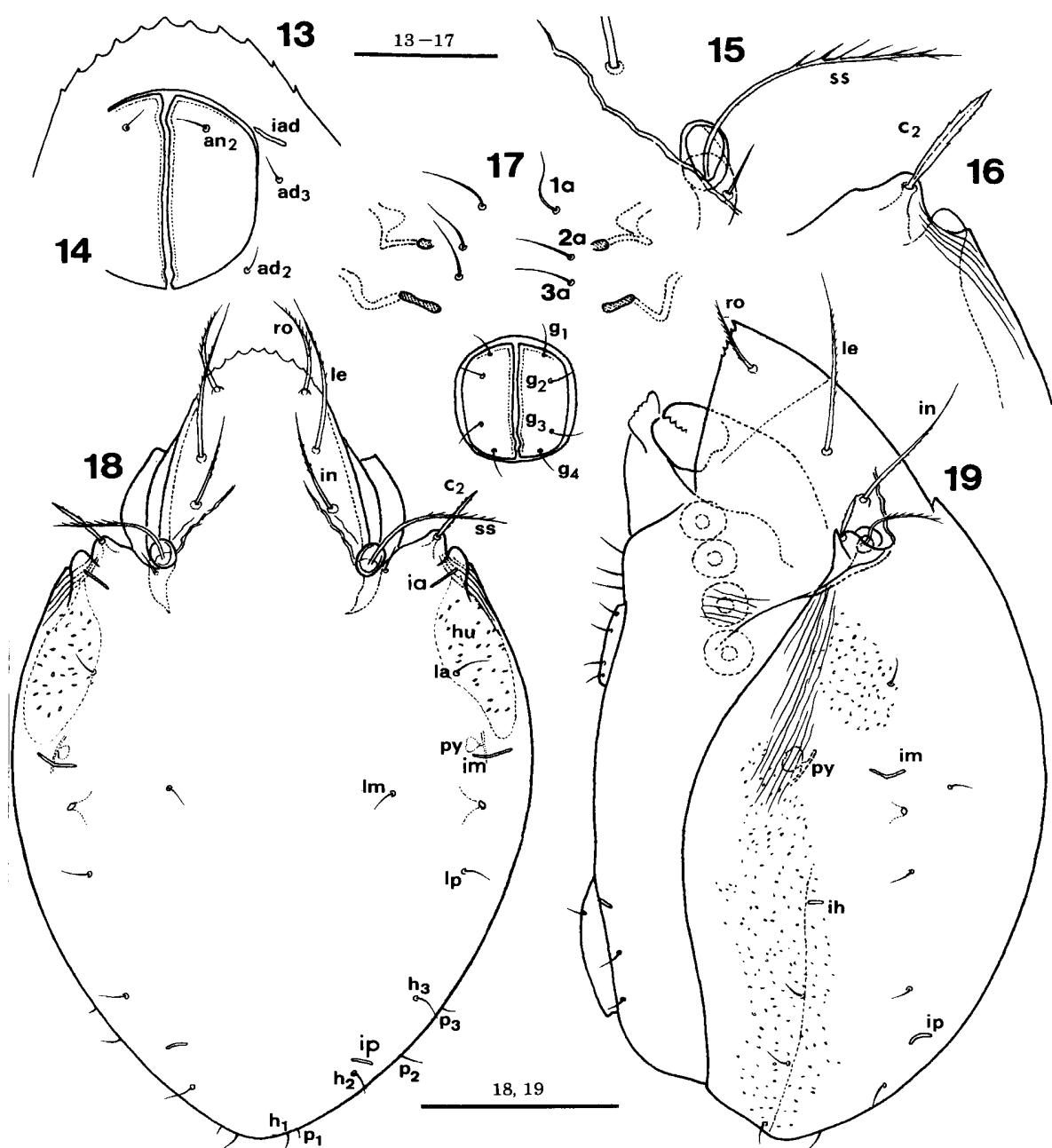
Notogaster. Dorsosejugal scissure absent. Humeral projection accompanied posteriorly by another projection of same size; humeral seta *c*₂ thickened and barbed bilaterally (Fig. 16). Remaining 9 pairs of notogastral setae fine and smooth (Fig. 18). Five pairs of lyrifissures; *ia*, *im*, and *ip* long and distinct (Fig. 18); *ips* and *ih* small and indistinct. Pyriform organ *py* located under *im* inside body. Integument of notogaster with fine wrinkles from humeral projection to vicinity of *py* (Fig. 19). Numerous irregular light spots found only in humeral region in dorsal view, but also found along notogastral margin in lateral view.

Ventral side. Genital aperture with 4 pairs of setae; interspace *g*₂–*g*₃ distinctly wider than *g*₁–*g*₂ or *g*₃–*g*₄ (Fig. 17). Anal aperture with only one pair of setae; posterior anal setae *an*₁ lacking (Fig. 14). Two pairs of adanal setae. Adanal fissure *iad* long and aligned obliquely. Epimeral seta *1a* nearly of same length as *2a* and *3a* (Fig. 17).

Legs (Figs 20–23). Chaetotaxy of legs I, 1–5–2–4–20; II, 1–5–2–4–16; III, 2–3–1–3–15; IV, 0–2–2–3–12. Solenidiotaxy I, 1–2–2; II, 1–1–2; III, 1–1–0; IV, 0–1–0. On tarsi I–IV ventral setae more strongly barbed than dorsal setae. Tibia I triangular; tibia II dilated anteriorly, but less so than in tibia I. Ventral carina of femora I–IV poorly developed, on femur II evident only as irregular margin of anteroventral corner. Trochantera III and IV similar in size. Trochanter IV without seta. No specialized strong setae on legs. All legs heterotridactylous.

Type series. Holotype (NSMT-Ac 10245, on slide) and 2 paratypes (NSMT-Ac 10246–10247, on slides): Ujina-jima Island, Hiroshima-shi, western Japan, 17-II-1991, J. Aoki. Lichen and moss growing on low coastal cliff (Fig. 24). The type series is deposited in the collection of the National Science Museum, Tokyo (NSMT).

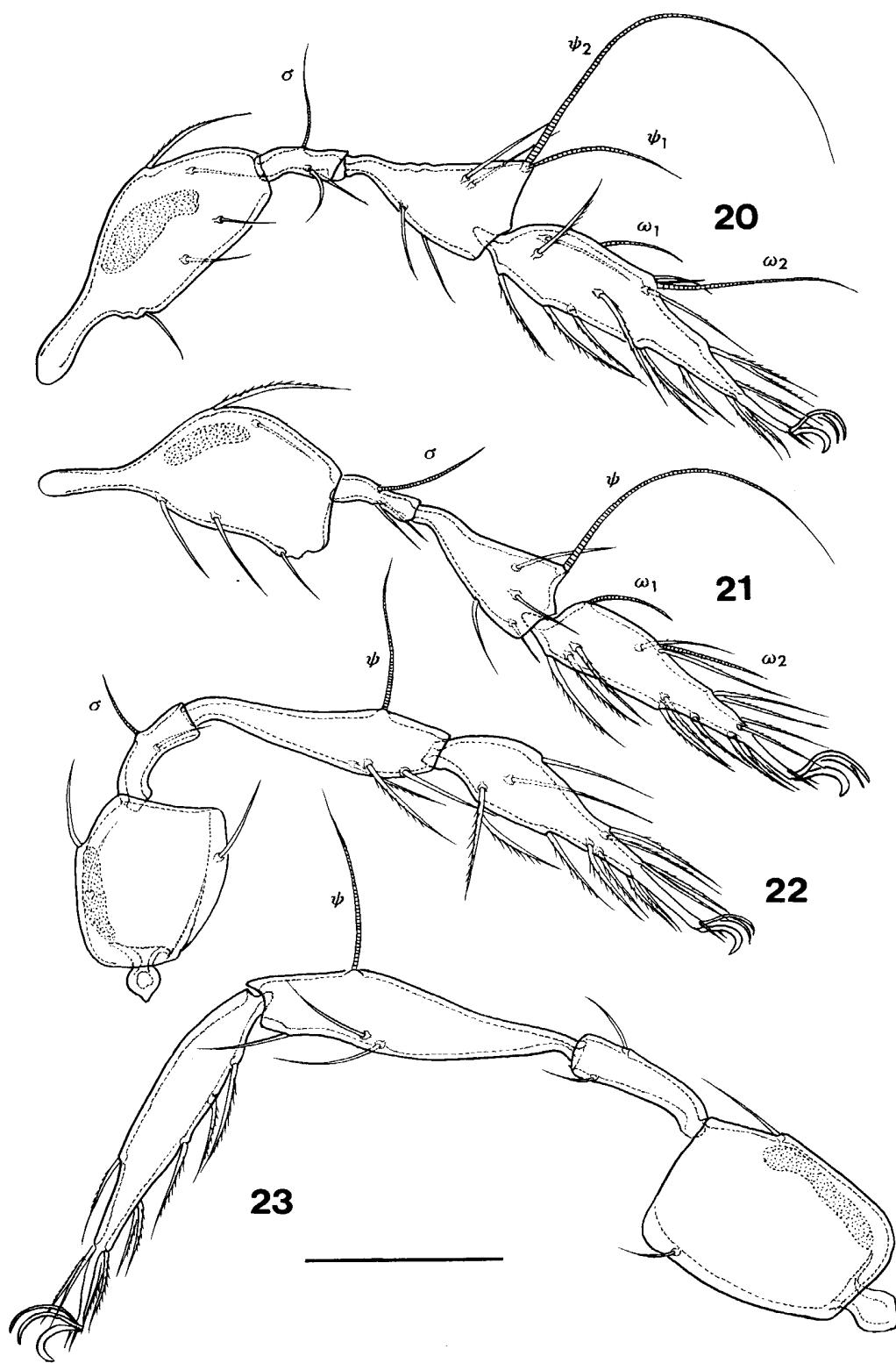
Remarks. The single previously known species of the genus *Mabulatrichus*, *M. dentatus* Coetzee, 1993 from South Africa, is easily distinguishable from the new species by the (1) rostral margin with 4 large teeth in the middle and small teeth on each side of rostrum, (2) lamellar setae not extending beyond the tip of the rostrum, (3) interlamellar setae not extending beyond the insertions of the lamellar setae, (4) sensilli with more than 12 pectinations on one side and about 6 pectinations on the other, (5) thick humeral seta, (6) simple structure of the humeral projections, (7) absence of lamella-like ridges, (8) numerous pores scattered mainly in the central part of the notogaster (in contrast, the pores are restricted to the humeral and marginal parts in the new species), and (9) epimeral setae *1a* being far longer than *2a* or *3a* (see Coetzee 1993).



Figs 13-19. *Mabulatrichus litoralis* sp. nov. 13, rostral margin; 14, anal aperture; 15, bothridium and sensillus (ss); 16, humeral projection and humeral seta (c_2); 17, genital and epimeral region; 18, dorsal side of body; 19, left lateral side of body. Scales: 0.05 mm (13-17); 0.1 mm (18 and 19).

New species of Zetomotrichidae from Japan

357



Figs 20–23. *Mabulatrichus litoralis* sp. nov. 20, leg I (antiaxial); 21, leg II (antiaxial); 22, leg III (paraxial); 23, leg IV (antiaxial). Scale: 0.05 mm.

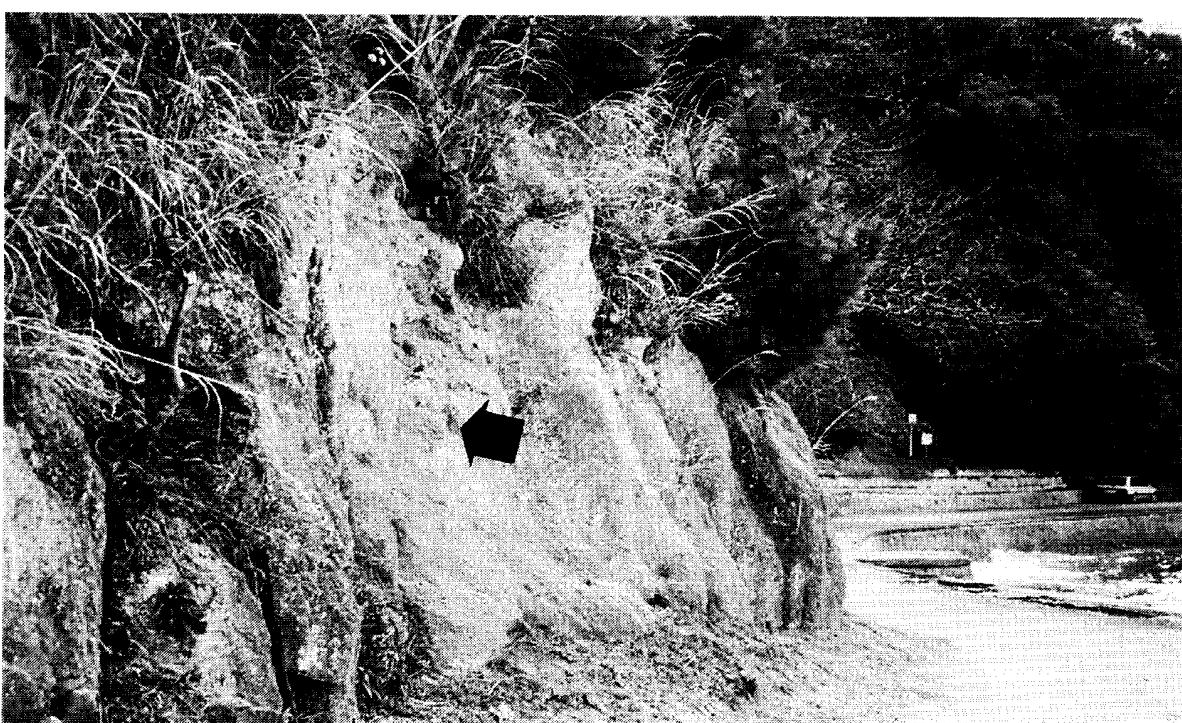


Fig. 24. The collecting site of *Mabulatrichus litoralis* sp. nov. at the type locality, Ujina-jima.

***Zetomotrichus bidentata* Coetzee, 1993**

Zetomotrichus lacrimans Grandjean var. *bidentata* Hammer, 1977, p. 43, pl. 21, fig. 34.

Zetomotrichus bidentata Hammer, 1977 in Coetzee, 1993, p. 136.

Hammer (1977) described *Zetomotrichus lacrimans* Grandjean, 1934 var. *bidentata* based on specimens collected from north-western Pakistan. Naming and describing a variety are, of course, not prohibited, but the name of a variety has no status in zoological nomenclature if it was proposed after 1960 (International Code of Zoological Nomenclature, Fourth Edition, Article 15.2).

Later, Coetzee (1993) gave the variety a new status and raised it to species rank as *Z. bidentata* Hammer, 1977 stat. nov. We agree with Coetzee (1993) that Hammer's variety is distinct from *Z. lacrimans*. However, because of article 15.2 of the ICZN, it is impossible to use the name *bidentata* with the original Author's name and the year. According to Article 45.5.1, the author of *Z. bidentata* should be Coetzee, 1993 and not Hammer, 1977.

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